

self devised—gas analysis, mineral water analysis, flame reactions. It is not easy to describe Bunsen's relation to chemical science. He was a perfect type of "Naturforscher," a word for which there is hardly an English equivalent. He lived in his laboratory, ever absorbed, he seemed, in finding his way through natural problems, like a navigator always on the bridge sailing in an unknown archipelago. His writings are hardly more than his log, and his lectures were the narratives of his own particular voyage in the region called chemistry. To a listener who had a fair knowledge of chemistry and its literature it seemed as if there were no part of inorganic chemistry which Bunsen had not made in some way his own. In the laboratory it was the same; from the making of a borax bead to the execution of the most complicated analysis there was the Bunsen method of doing things. Spectroscopy, gas analysis, and electrolytic chemistry for long seemed wholly his. No chemist had a broader or more philosophical outlook than he; on the one hand he had a profound distrust of theory that went in advance of experiment, and on the other hand he despised all kinds of aimless or recipe work. Of the periodic classification of the elements he said at one time, "Ja, solche Regelmässigkeiten findet man in den Börsenblättern"; of a well known standard work on analysis he said "Koch-buch!" and indignantly ordered its removal. What a memorable experience it was for a student to work with Bunsen through the Russian Mint residues! The innumerable devices of his own, the "nursing" operations at different stages, the tales of his earlier efforts and disasters, the eager hope "vielleicht steckt etwas neues darin," the dry assurance "ja, alle Wochen werden ein Paar neue Platinmetalle entdeckt"—all these things come to mind to recall the image of a man in whom the art of a past master was combined with the artlessness of a child.

It is impossible to estimate the influence of such a man; but in the volumes which it is the object of this notice to commend, it is possible to read the record of his work and to catch something of the spirit which animated the worker.

The collected works are published under the auspices of the German Bunsen Society for Applied Physical Chemistry, and are edited by Prof. Ostwald and Dr. Bodenstein. We are therefore assured that the task has been performed with pious care and with fulness of knowledge. The original intention of publishing a biography of Bunsen had to be abandoned owing to his express order, so characteristic, that his literary remains should be destroyed. He also desired that from his own letters in the possession of others nothing of a personal character should be published. The gap thus left is probably not so great as might be imagined, and one feels, after reading the prefatory memoirs by Sir Henry Roscoe, Dr. Rathke, and Prof. Ostwald himself, that we have probably all we really need to know. "Bunsen stories" were doubtless good to those who knew him, but to those who did not they were apt to be like most tales of university dons, and the collection which has been

privately published seems rather trivial, and jars somewhat on the ears of the faithful. But the collection of his writings makes a noble monument, and the thanks of all chemists are due to the Bunsen Society and to the two editors who have undertaken the laborious task and have executed it so well.

ARTHUR SMITHRELLS.

OUR BOOK SHELF.

The Practical Study of Malaria and other Blood Parasites. By Dr. J. W. W. Stephens and S. R. Christophers. 2nd Revised Edition. Pp. iii+396 and xliv. (London: Published for the University Press of Liverpool by Williams and Norgate, 1904.) Price 12s. 6d. net.

THIS volume gives a very full and complete account of the practical methods employed in the study of malaria and kindred protozoan diseases of man and animals. The book being intended primarily for the use of medical men in the tropics, who may be far from any laboratory, abounds in practical hints and suggestions which will enable good work to be accomplished with a minimum of apparatus, &c.

The methods of making and staining blood-films are given very fully, and the appearances of normal blood and of the various malaria parasites carefully described. In connection with malaria, the methods of catching, breeding, keeping, and feeding mosquitoes for purposes of malaria study receive considerable attention, and the life-history of the mosquito and the characters of a number of the more important species have no less than 200 pages devoted to them. Chapters then follow on the clinical and epidemiological study of malaria, and finally the haemamœbidæ, trypanosomes, spirochætes, and filariæ are considered. This entails descriptions of the anatomy and classification of the chief species of ticks, fleas, tsetse and other biting flies, and a mass of detail is thus brought together in a form required by the investigator for which he otherwise would have to search in many scattered papers and works of natural history. In this respect the book will be of great value in laboratories of medical protozoology and the like. There are few points to which exception can be taken, for the book is the outcome of the authors' own experience on the subjects of which they write. It may be doubted, however, if methylated spirit can take the place of methyl alcohol for making up the Leishman blood-stain, and the authors' view that blackwater fever is malaria plus haemoglobinuria excited by chill, quinine, or other simple cause is open to question.

The book can be recommended as a most valuable guide, and the numerous illustrations, diagrammatic though many of them are, enhance its usefulness.

R. T. HEWLETT.

Pictures from Nature. By Richard and Cherry Kearton. Portfolio of fifteen Rembrandt photogravures. Size 15in. x 11in. (London: Cassell and Co., Ltd.) Price 10s. 6d. net.

THE remarkable photographs taken by the Brothers Kearton of animal life in many aspects have often been described in these columns in terms of the highest praise. The fifteen pictures of birds and other animals, among their natural surroundings, reproduced for the present portfolio, represent the high-water mark of faithful portraiture in natural history.

The plates include the following subjects:—Black throated diver, kittiwakes at home, leverets in their form, kingfisher waiting for its prey, squirrel, puffins

at home, young willow wrens, ring dove or wood pigeon, young cuckoo and sedge warblers, hedgehog, young long-eared owls, gannet or solan goose, peewit or lapwing, sparrowhawk adding sticks to her nest, and the great tit or oxeye.

These handsome pictures provide the best possible tribute to the patient power of silent watching which the Brothers Kearton have developed during the last thirteen years in order to take advantage of opportunities of photographing animals in their natural surroundings.

Meteorologie und Klimatologie. By Prof. Dr. Wilhelm Trabert. Pp. 127; with 37 figures in the text. (Leipzig: Deuticke, 1905.) Price 5 marks.

In this little book, which forms part xiii. of Prof. Klär's "Die Erdkunde," the author attempts to outline the general principles of meteorology and their application to the study of climate in a single work. The meteorological elements, and the making and reducing of observations are first dealt with; next comes a section on atmospheric physics, the distribution of temperature and its variations, the circulation of the atmosphere, evaporation and condensation; and, finally, a section on weather and climate, which includes chapters on weather forecasting, the chief types of climate, and the climatic characteristics of the main land divisions of the globe.

Where so much is attempted in so small compass, there is, of course, constant risk of the treatment of parts of the subject becoming hopelessly inadequate, but Prof. Trabert has succeeded in avoiding this; the essential points are selected with extraordinary skill and presented with great clearness and conciseness. The omission of details of construction of instruments in part i. is especially satisfactory—most books on meteorology are overburdened with matter which is only wanted by practical observers—although in some cases more modern types of instrument might have been selected for illustration. The most successful section of the book is, in our opinion, that on atmospheric physics, in which the vertical distribution of temperature and the forms of isobaric surfaces are given the prominence they deserve, but do not always get.

Prof. Trabert's book is an excellent introduction to such classics as Hann's "Lehrbuch" and "Klimatologie," on which it is to a certain extent modelled, and we strongly commend it to elementary students and teachers.

A Popular Introduction to Astronomy. By the Rev. Alex. C. Henderson. Pp. 114. (Lerwick: T. and J. Manson, 1905.) Price 2s. 6d. net.

In this book there are three chapters, occupying sixty-three pages, and a series of thirteen "notes" which take up the remainder of the text. In chapter i. we find a very general, yet simple and instructive, description of the solar system, its probable origin, and the nature, appearance, dimensions, and distances of its various individual components. The explanations given are brief, but they are lucid, and the verbal illustrations are hornely enough to appeal to the simplest minds. Chapter ii. deals with the apparent and real motions of the heavenly bodies, and here again the beginner should find no difficulty in grasping the fundamental ideas. Comets are discussed in chapter iii., which really consists of a description of Biela's famous comet and of the meteoritic genesis of these bodies.

The thirteen "notes" comprise a *mélange* apparently consisting of extracts and examples taken from the author's note-book, and it is rather difficult to see to what class of reader they will appeal. Portions

of them are certainly too erudite to suit real beginners, whilst they are not of the form to appeal to more advanced students. For example, the observing of the sunrise, combined with the consultation of a year book, would hardly answer to the description of an "accurate method" of determining time. Double stars, climatic variations, auroræ, eclipses, the lunar phases, and the zodiac are amongst other things dealt with in this section of the book. W. E. R.

Fragmenta Phytographiae Australiae occidentalis. By L. Diels and E. Pritzel. Pp. 608. (Leipzig: W. Engelmann, 1905.)

ALTHOUGH the floras of the different Australian colonies present a certain homogeneity that unites them into a definite "Flora Australiensis," there is also a considerable diversity between the floras of the eastern and western sides of the continent; that of the western half is distinguished by its richness, the singular modifications due to physical conditions and the large proportion of endemic species. Exclusive of the northern tropical region, the vascular plants of Western Australia, according to the evidence of the Government botanist, Mr. A. Morrison, do not fall far short of 4000 species, and most of these are found in the south-west. The writers of this volume travelled through this portion of the colony, and also penetrated into the interior from Geraldton to Cue, and as far as Ranowna and Menzies in the Coolgardie district. Phytogeographical limits are determined mainly by the rainfall, which reaches a maximum of 39 inches in the neighbourhood of Cape Leeuwin and diminishes rapidly to 9 inches at Shark Bay in the North and Southern Cross inland; the botanical provinces outlined in this volume have been mapped out in accordance with the rainfall.

The book is primarily a systematic compilation of the authors' collections, and although there are interesting notes on morphology and habit, the principal feature is the intimate knowledge which the authors display of the distribution of the various species. A revised arrangement of the Verbenaceæ is given, with analytical keys and numerous illustrations. Additions have been made to most of the typical genera, to mention only *Acacia*, *Drosera*, *Hibbertia*, and several of the *Myrtaceæ*. Taken in conjunction with Bentham's "Flora Australiensis," Baron von Mueller's "Fragmenta," and Spencer le Moore's notes, these "Fragmenta" provide the necessary data for a fairly complete flora of the colony. Dr. Diels proposes to write a continuous phytogeographical account later, wherein it may be expected that he will summarise the extraordinary modifications of the desert and other plants that are no less unique than those of the Egyptian desert flora which Volkens has so vividly portrayed.

Sporting Sketches. By E. Sandys. Pp. vii + 389; illustrated. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1905.) Price 7s. 6d. net.

MR. EDWYN SANDYS is so well known to bird-lovers and sportsmen in general by such works as "Upland Game Birds" that any volume of a somewhat similar nature is almost sure of a hearty reception on the part of that section of the public to which it more specially appeals. In the volume before us the author has collected together a number of articles on sporting subjects which originally appeared in that excellent American sporting magazine *Outing*, and to these he has apparently added others which now see the light for the first time. Whether, however, new or old—and the author seemingly gives us no clue on this point—the articles have such a freshness about